



CHRONIC BERYLLIUM DISEASE SURVEILLANCE OVERVIEW



SURVEILLANCE

- Ongoing, systematic **collection, analysis,** and **interpretation** of:
 - agent/hazard - exposures
 - risk factors - health event data (medical surveillance)
- Essential to planning, implementation, and evaluation of control and prevention activities
- Requires timely **dissemination** of these data to those responsible for **prevention and control**



MEDICAL SURVEILLANCE

- Detect/define a problem
- Estimate magnitude of the problem
- Determine distribution of problem in workforce
- Generate hypotheses and stimulate research
- Evaluate protection and control measures
- Monitor changes/trends in disease frequency
- Facilitate planning
- Depends on case reports/medical screening results



MEDICAL SCREENING vs. SURVEILLANCE

Surveillance

- Ongoing, systematic collection of health information from a population.
 - “Active” medical surveillance requires selection, recruitment, and medical screening.
 - For beryllium, screening is provided in the context of our current surveillance program.



MEDICAL SCREENING vs. SURVEILLANCE

Screening

- Medical testing of individuals for the purpose of:
 - Early detection of disease or conditions
 - Providing treatment that can affect morbidity or mortality
 - Secondary prevention

ROCKY FLATS AND Y-12 BERYLLIUM WORKER HEALTH SURVEILLANCE PROGRAMS

- Established in 1991
- Screened over 8,800 current and former beryllium workers
- Identified 108 cases of chronic beryllium disease (thru 4/30/98), RF (81), Y-12 (27)
- Following 225 individuals with beryllium sensitization RF (163), Y-12 (62)
- Providing retesting



ROCKY FLATS

- Operated by the DyneCorp of Colorado Inc., Health Effects Department at the site clinic and through subcontracts.
- Examinations are provided to any **current or former** worker who self-identifies as having been exposed and wishes to participate.
- Screening examination includes a **questionnaire** for respiratory disease symptoms, a **chest x-ray**, and a **blood draw**.



ROCKY FLATS (cont'd)

- **Site clinic** administers exam for current employees and most local former employees.
- Other local former employees seen at **off-site clinics**.
- Former employees who have moved from the local area are sent to a **regional occupational health clinic**.



ROCKY FLATS (cont'd)

- **Questionnaire results** are reviewed by Medical Department staff.
- X-ray films are read by **board certified/B reader radiologists**.
- National Jewish Medical and Research Center (NJMRC)/Hospitals of the University of Pennsylvania (HUP) provide the **beryllium lymphocyte proliferation test (Be-LPT)** and **follow-up medical examinations** for individuals suspected of having CBD.

Y-12 BERYLLIUM WORKER ENHANCED MEDICAL SURVEILLANCE PROGRAM

- Operated by the Oak Ridge Institute for Science and Education (ORISE).
- A roster of over 3,000 living current and former beryllium workers has been constructed based on plant records.
- Between 12/93 and 12/96 over 1,100 current and former beryllium workers were screened.



Y-12 (cont'd)

- A questionnaire administered to current employees allowed **self identification**
- Screening medical examination provided by **offsite clinic**, Be-LPT, chest radiograph, PFTs, symptoms questionnaire, and physical examination.
- Be-LPTs were provided by ORISE and NJMRC.
- Diagnostic examinations provided by Vanderbilt University.



WHAT HAVE WE LEARNED

- Chronic beryllium disease more prevalent than we initially thought
- CBD cases are not restricted to those whose job title indicated beryllium work
- Many workers sensitized to beryllium: will likely go on to develop CBD



WHAT HAVE WE LEARNED

- “Retesting” finds cases of CBD and sensitization after initial negative test
- Adherence to the current OSHA Permissible Exposure Limit (PEL) of $2\mu\text{g}/\text{m}^3$ does not offer adequate protection from CBD (“what is adequate protection?”)



PERIPHERAL BLOOD LYMPHOCYTE PROLIFERATION TESTING

	RFP Project 6/91-4/98	Y-12 Plant 12/93-4/98
Number of Individuals Tested	6702	1738
CBD Cases	81 ¹	27 ²
Sensitized	163	62

1. 23 cases of CBD found prior to June 1991
2. 9 cases of CBD found prior to December 1993

PREVALENCE OF SENSITIZATION BY JOB TITLE AT THE OAK RIDGE Y-12 PLANT¹ (12/93 - 12/96)

	Number Tested	Number Sensitized	Prevalence (%)
Laboratory Technician	50	7	14.0%
Machinist	286	29	10.1%
Inspector (Except Security)	70	7	10.0%
Cleaner	43	4	9.3%
Chemical Operator	95	5	5.3%
Electrician	97	4	4.1%
Supervisor	79	2	2.5%
Overall	1151	76	6.6%

1. Some individuals held more than one job title.

PREVALENCE OF SENSITIZATION BY JOB TITLE AT ROCKY FLATS¹

(6/91-3/98)

	Number Tested	Number Sensitized	Prevalence (%)
Health Physics Technician	42	5	11.9%
Beryllium Machinist	201	23	11.4%
Construction Trades	192	20	10.4%
Decontamination & Decommissioning	158	12	7.6%
Radiation Monitor	347	22	6.3%
Machinists and Metal Workers (not Be)	1080	60	5.6%
Laborers	484	26	5.4%
Overall	6614	209	3.2%

1. Some individuals held more than one job title.



RESULTS FROM ROCKY FLATS 3-YEAR RETESTS (8/93-3/98)

	Number Retested	Sensitized or CBD
Current Employees	1415	34
Former Employees	1860	27



CURRENT BERYLLIUM SURVEILLANCE PLANS

- Provide screening for all DOE workers “formerly exposed” to beryllium
- Expansion of current program this fiscal year
- Identify, notify and screen additional 6,000+ former workers
- Ensure appropriate ongoing medical follow-up for those sensitized to beryllium or with CBD



CURRENT BERYLLIUM SURVEILLANCE PLANS (cont'd)

- Continue analyses of surveillance data
 - How often to retest?
 - What is rate progression from sensitization to disease?
 - What is the natural history of those who develop CBD?
 - Are our control measures working?
- Support research needed to:
 - Understand disease mechanism, genetic susceptibility
 - Improve screening test